REMARKS

This application has been carefully reviewed in light of the Office Action dated December 1, 2003. Claims 26, 34-35, 71 and 72 have been amended. Claims 33 and 73 have been canceled. Claims 26-32, 34-35, and 71-72 are now pending. Please reconsider the above-referenced application in light of the amendments and following remarks.

Claims 26-35, 73-74 and 76 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Hamrah. The rejection is respectfully traversed.

Hamrah fails to anticipate the present invention. Hamrah does not teach a composition suitable for use in etching an insulative layer comprising, "a flowing plasma etchant mixture consisting essentially of at least one fluorocarbon and ammonia, wherein the flow rate ratio of each fluorocarbon to ammonia is from about 2:1 to about 40:1," as recited in claim 26 (emphasis added).

Hamrah teaches an etchant mixture for increasing the oxide etch rate while suppressing the polysilicon etch rate (Page 2, lines 33-34). Hamrah's etchant mixture consists of CHF_3, Ar, CF_4, and NH_3 (Example 2, lines 1-10, Example 3, lines 40-50, and page 7 (lines 15-55). Hamrah discloses that the ratio of CF_4: NH3 is less than 1:1.

For example, in Hamrah's Example 2, tables 1-3, the flow rate of CF_4 is 3 sccm and NH_3 is 10 sccm; the flow rate of CF_4 is 9 sccm and NH_3 is 10 sccm; and the flow rate of CF_4 is 9 sccm and NH_3 is 10 sccm. The flow rate ratio of CF_4:NH_3, respectively, is 1:3; .9:1; and .9:1. Similarly, in Hamrah's Example 3, tables 1-3, the flow rate of CF_4 is 3 sccm and NH_3 is 4 sccm; the flow rate of CF_4 is 6 sccm and NH_3 is 7 sccm; and the flow rate of CF_4 is 9 sccm and NH_3 is 10 sccm. The flow rate ratio of CF_4:NH_3 is .75:1; .86:1; and .9:1.

Accordingly, Hamrah does not teach that "the flow rate ratio of each fluorocarbon to ammonia is from about 2:1 to about 40:1," as recited in claim 26 (emphasis added). Claims 27-32 and 34-35 depend from claim 26 and are similarly allowable for at least the reasons provided above. Withdrawal of the rejection is solicited.

Claims 31 and 75 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hamrah in view of Becker. The rejection is respectfully traversed.

For similar reasons provided above, Hamrah does not teach or suggest the limitations of claim 26 from which claim 31 depends. In particular, Hamrah does not teach or suggest a plasma etchant mixture where "the flow rate ratio of each fluorocarbon to ammonia is from about 2:1 to about 40:1," as recited in claim 26 (emphasis added). Hamrah discloses that the ratio of CF_4: NH3 is less than 1:1. Becker is relied upon for teaching an etchant composition consisting of CF_4, CHF_3 and CH_2F_2, and adds nothing to rectify the deficiencies associated with Hamrah.

In addition, there is no motivation to combine the references. Becker teaches a chemical etchant composition of CHF_3, CF_4, AR, and a CH_2F_2 additive material. The additive material is needed because "CH_2F_2 is added to offset the disasociation properties of nitride as compared to oxide." (Col. 2, lines 24-25) (emphasis added). Becker's etchant composition relies on the presence of a silicon nitride layer, i.e., an etch-stop layer. (Col. 6, lines 16-20). In Hamrah, there is no silicon nitride layer.

Accordingly, the references are not properly combinable and do not teach or suggest that "said fluorocarbon is a combination of CF_4, CHF_3, and CH_2F_2," as recited in claim 31. For at least these reasons, claim 31 is allowable over the prior art of record.

Claims 71 and 72 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Levinstein in view of Hamrah. The rejection is respectfully traversed.

Alone or in combination, the cited references do not teach or suggest claims 71 and 72. The references do not teach or suggest a composition suitable for use in etching an insulative layer comprising, "a flowing plasma etchant mixture comprising at least CF_4 and NH_3, wherein the flow rate ratio of CF_4:NH_3 is greater than about 3:1," as recited in claim 71 (emphasis added), or "a flowing plasma etchant mixture comprising at least CHF_3 and ammonia, wherein the flow rate of said CHF_3 is from about 37 to 42 sccm," as recited in claim 72.

Levinstein teaches a two-etchant composition: "CHF_3 and NH_3." (Col. 6, lines 35-37). Hamrah's etchant mixture consists of CHF_3, Ar, CF_4, and NH_3 (Example 2, lines 1-10, Example 3, lines 40-50, and page 7 (lines 15-55). Thus, there is no motivation to combine Levinstein and Hamrah when Levinstein teaches a two-etchant mixture and Hamrah teaches a four-etchant mixture.

Further, Hamrah teaches a four-etchant mixture for increasing the oxide etch rate while suppressing the polysilicon etch rate (See Page 2, lines 33-34). Levinstein is directed to providing a phosphorus-rich or a phosphorus-poor insulating layer to avoid cracks and fissures in the aperture of a semiconductor device. Thus, there is simply no motivation to combine the references.

Moreover, Levinstein does not teach or suggest flow rates or a flow rate ratio of the two-etchant composition. Hamrah discloses that the ratio of CF_4: NH3 is less than 1:1 and not greater than about 3:1. Hamrah also does not teach or suggest Applicant's claimed flow rate that is from about 37-42 sccm. Accordingly, withdrawal of the rejection is solicited.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

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Respectfully submitted,

By_____

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